

Title: **Ecological Benchmarking to Explore Alternative Fishing Schemes: The Danish Demersal Fishery in the North Sea**

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Abstract: The cod stock in the North Sea is threatened by overexploitation. To recover this fishing stock, pressure needs to be reduced. This implies that catch compositions with small amounts of cod are preferred by public policy makers. The present analysis assesses the technological efficiency of fishing trips, considering landings of cod as an undesirable output. A non-parametric frontier technology approach based on directional distance functions is applied to explore alternative fishing activities for Danish gill netters operating in the North Sea with the goal of protecting the cod stock. Since the performance observed on different fishing trips may be under influence of the external operating environment, a four-stage approach introduced by Fried et al. (1999) is applied to correct for such exogenous factors. The corrected directional distance function efficiency scores reveal the behavioural inefficiencies, i.e., prospects for decreasing the catch of cod while catch of other species are increased.